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Knowledge of the dental healthcare specialists about home bleaching

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Abstract

Aim: Cosmetic dentistry is the branch of dentistry that focuses on improving the appearance of the mouth, teeth, gums, and overall smile. Common procedures include home bleaching, veneers, fillings, and implants. Therefore, this study was designed to explore dental healthcare specialists' knowledge about home bleaching.

Material and Methods: The present cross-sectional study based on a questionnaire was conducted among dental healthcare specialists in March 2022. The survey was conducted by simple random sampling among dental healthcare specialists from different regions of the country by sharing a link to the questionnaire via social media like WhatsApp, Snapchat and Telegram. Collected data were statistically analyzed for the frequency and association of responses.

Results: Among 624 participants, 464 (74.4%) males and 160 (11.9%) were asked about aspects of dental bleaching. Results revealed that some of the individuals in our study benefited after one week of the appropriate application of home bleaching, while some individuals faced health complications such as headache, dizziness, nausea and vomiting etc.

Discussion: Most individuals lack knowledge about appropriate applications of home bleaching. Home bleaching is the most effective remedy for dental treatment as most individuals get benefits after one week of application.

Keywords

Home Bleaching, Headache, Dental Applications, Health Complications

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Introduction

Home bleaching involves visiting a dental clinic and acquiring the try for the application of a chemical agent to oxidize the organic pigmentation in the tooth. Nowadays, dental treatment with cosmetics is one of the most common methods because patients want to maintain the appearance of their smiles and general health [1]. Dentistry has seen technological advancements due to patients' desires to enhance the beauty of their teeth, which is an important component of life satisfaction. According to a UK survey, 28% of people were unhappy with their smile, and out of the 3215 participants, 50 percent had some sort of discoloration [2]. Another research conducted in the UK in 2004 indicated that people's concern about dental appearance among that teeth color was common. The market for teeth-whitening solutions has grown tremendously over the last few years due to the growing demand for whiter teeth. Currently, the most widely advertised oral care products are those that whiten teeth [3].

Bleaching is a common type of tooth whitening used for the treatment of affected teeth. It is thought to be the least invasive aesthetic procedure for enhancing stained teeth's appearance [2]. Bleaching can be done in a dental clinic or at home. The most popular methods used for home bleaching nowadays are (i) whitening mouth rinses that combat plaque formation and remove stains; (ii) whitening chewing gums, which are widely enjoyed and accepted by many people as they are a common activity among both adults and children, may therefore be a way to administer local medication into the oral cavity [4]. In addition to increasing saliva flow and removing food particles, surface stains, and plaque, chewing gum-based items are very important and have several advantages of pharmacotherapy (iii). Whitening dental floss has also been developed to reduce stains in the anterior teeth and sub-gingival regions [5].

Teeth discoloration can be intrinsic or extrinsic, depending on the cause. Based on the type of discoloration hydrogen peroxide, sodium tripolyphosphate, sodium hexametaphosphate, and sodium percarbonate are the active components used in the home bleaching solution. Many whitening products also contain carbamide peroxide as an active component [6]. It is a stable compound that disintegrates when it comes into contact with water, releasing H2O2 (10 percent carbamide peroxide, 3 % hydrogen peroxide and 7 % urea) [7]. Dental stains can be inhibited and removed with the help of hydroxy-apatite-bound sodium tripolyphosphate (STPP) because of its inhibition activity on the adsorption of secreted proteins [8].

The current study aimed to explore the knowledge of home bleaching among dental healthcare specialists.

Material and Methods

After getting the ethical clearance from the Scientific Research Ethics Committee (Reference No.:444-40-9784-DS) of Najran University, the study questionnaire was distributed to dental healthcare specialists.

Study sample

The study sample comprised 624 dental professionals and their knowledge of home bleaching and their personal experience were assessed through a questionnaire survey.

Study design

This cross-sectional study was carried out in Saudi Arabia among dental healthcare specialists by sharing a questionnaire link via WhatsApp, Snapchat and Telegram. This questionnaire had specific questions related to knowledge of bleaching.

Statistical analysis

All survey data was transferred from a Google-Sheet to an excel-sheet and then put for further analyses into the Statistical Package for Social Sciences program (version 25, IBM software; Chicago, USA).

Ethical Approval

Ethics Committee approval for the study was obtained.

Results

This study comprised 624 participants, including 464 (74.4%) males and 160 (11.9%) female participants. Among 624 participants, 221 (35.4%) were dental students, 194 (31.1%) were dental interns, 134 (21.5%) were general practitioners and 75 (12%) were specialists. The social and demographic characteristics of participants involved in the current research are shown in Table 1.

Table 2 shows the characteristics of home bleaching among participants, carbamide peroxide was considered the active ingredient in home bleaching by 66 (10.6%) dental students, 55 (8.8%) dental interns, 24 (3.8%) dental practitioners and 17 (2.7%) dental specialists and hydrogen peroxide was chosen by 107 (17.1%) dental students, 101 (16.2%) dental interns, 76 (12.2%) dental practitioners and 38 6.1% dental specialist, while sodium perborate was thought effective ingredient by 34 (5.4%), 2 6(4.2%), 24 (3.8%), 13 (2.1%) dental students, interns,

Table 1. Demographic Details of Participants

	n	Percentage
Age		
20-25	253	40.5
25-30	195	31.3
30-35	102	16.3
35-more	74	11.9
Total	624	100.0
Gender		
Male	464	74.4
Female	160	25.6
Total	624	100.0
Current Level		
Dental student	221	35.4
Dental interns	194	31.1
General practitioner	134	21.5
Specialist	75	12.0
Total	624	100.0
Region		
Southern region	85	13.6
Northern region	173	27.7
Western region	97	15.5
Eastern region	77	12.3
Middle region	71	11.4
Not answered	121	19.4
Total	624	100.0

Table 2. Characteristics of home bleaching in participants

Response		Specialty				Total	p-value
		Student	Intern	Practitioner	Specialist		
What is the active ingredient in teeth- bleaching material?	Carbamide peroxide	66	55	24	17	162	0.467
		10.6%	8.8%	3.8%	2.7%	26.0%	
	Hydrogen peroxide	107	101	76	38	322	
		17.1%	16.2%	12.2%	6.1%	51.6%	
	Sodium perborate	34	26	24	13	97	
		5.4%	4.2%	3.8%	2.1%	15.5%	
	other	14	12	10	7	43	
		2.2%	1.9%	1.6%	1.1%	6.9%	
What did you preferr of the concentration of home bleaching material?	Carbamide peroxide 16%	83	53	31	15	182	0.004
		13.3%	8.5%	5.0%	2.4%	29.2%	
	Carbamide peroxide 18%	78	96	55	29	258	
		12.5%	15.4%	8.8%	4.6%	41.3%	
	Carbamide peroxide 20%	41	33	35	20	129	
		6.6%	5.3%	5.6%	3.2%	20.7%	
	Carbamide peroxide 22%	19	12	13	11	55	
		3.0%	1.9%	2.1%	1.8%	8.8%	
What did you preferr of the concentration of office bleaching material?	Hydrogen peroxide 20%	70	59	28	13	170	0.011
		11.2%	9.5%	4.5%	2.1%	27.2%	
	Hydrogen peroxide 30%	76	73	45	21	215	
		12.2%	11.7%	7.2%	3.4%	34.5%	
	Hydrogen peroxide 35%	56	45	50	29	180	
		9.0%	7.2%	8.0%	4.6%	28.8%	
	Hydrogen peroxide 40%	19	17	11	12	59	
		3.0%	2.7%	1.8%	1.9%	9.5%	
Does teeth bleaching cause damage to fillings or restorations?	Yes	60	48	31	18	157	0.843
		9.6%	7.7%	5.0%	2.9%	25.2%	
	No	161	146	103	57	467	
		25.8%	23.4%	16.5%	9.1%	74.8%	
If you have done teeth bleaching, when can you do new composite restoration?	Immediately	56	45	21	15	137	0.137
		9.0%	7.2%	3.4%	2.4%	22.0%	
	One day later	39	42	23	8	112	
		6.3%	6.7%	3.7%	1.3%	17.9%	
	After a week	100	89	76	39	304	
		16.0%	14.3%	12.2%	6.3%	48.7%	
	After 1 month	26	18	14	13	71	
		4.2%	2.9%	2.2%	2.1%	11.4%	

practitioners and specialists, respectively. This response by participants showed a significant p-value. Regarding the damage caused by home bleaching, most of the participants (74.8%) agreed that bleaching does not cause any damage to the old restorations, and a significant number of participants (48.7%) suggested to do composite restoration after 1 week of bleaching.

Table 3 shows the correlation between the experience of home bleaching and speciality, the results revealed that most of the participants (345; 55.3%) used the different types of bleaching but only 30 (4.8%) dental students, 39 (6.3%) dental interns, 35 (5.6%) general dental practitioners and 4 (6%) dental specialists used home bleaching. Among them, 43 (6.9%) dental students, 37 (5.9%) dental interns, 38 (6.1%) general dental practitioners and 14 (2.2%) dental specialists did not face any side effects. Dental sensitivity (31.9%), gingival burn (24.9%) and headache (20.3%) were the commonly faced side effects of the bleaching with a significant P-value (<0.01). Only 76 (12.2%) dental students, 75 (12.0%) dental interns, 75 (12%) general dental practitioners and 47 (7.5%) dental specialists got benefits in their social relationships after the application of home bleaching. However, 155 (24.8%) participants who do bleaching feel the sensitivity of the teeth for more than one week with a significant P-value (<0.01). With the application of home bleaching, effective results were observed in 8 (1.3%) dental students, 5 (0.8%) dental interns, 3 (0.5%) dental practitioners, and 21 (3.4%) dental specialists. A significant number of dental health care professionals (404; 64.7%) advised bleaching to their knowns. Only 48 (7.7%) dental students, 36 (5.8%) dental interns, 15 (2.4%) dental practitioners, and 9 (1.4%) dental specialists thought that home bleaching is the most effective way.

Discussion

A recent randomized clinical study revealed that patients experienced more positive results after the application of 35 %

Table 3. Correlation between the experience of home bleaching and speciality

Response		Specialty				Total	p-value
		Student	Intern	Practitioner	Specialist		
Do you use bleaching for yourself?	Yes, over-the-counter bleaching	7	18	11	6	42	0.000
		1.1%	2.9%	1.8%	1.0%	6.7%	
	Yes, in-office bleaching	57	29	23	19	128	
		9.1%	4.6%	3.7%	3.0%	20.5%	
	Yes, home bleaching	30	39	35	4	108	
		4.8%	6.3%	5.6%	0.6%	17.3%	
	Yes (Combined)	6	9	21	31	67	
		1.0%	1.4%	3.4%	5.0%	10.7%	
	No	121	99	44	15	279	
		19.4%	15.9%	7.1%	2.4%	44.7%	
Did you have any complications or side effects?	Headache	30	14	15	11	70	0.000
						20.3%	
	Sensitivity	25	30	29	26	110	
						31.9%	
	Gingival burn	15	20	26	25	86	
						24.9%	
	No side effects	43	37	38	14	132	
		6.9%	5.9%	6.1%	2.2%	21.2%	
Have teeth get sensitive after using bleaching agent for more than 1 week?	Yes	45	41	35	34	155	0.000
		7.2%	6.6%	5.6%	5.4%	24.8%	
	No	55	54	55	26	190	
		8.8%	8.7%	8.8%	4.2%	30.4%	
Have you noticed a change in your confidence regarding your smile and social relationship after teeth bleaching?	Yes	76	75	75	47	273	0.000
		12.2%	12.0%	12.0%	7.5%	43.8%	
	No	24	20	15	13	72	
		3.8%	3.2%	2.4%	2.1%	11.5%	
How long does it take for your teeth to discolor again?	Not responded	208	182	111	43	544	0.000
		33.3%	29.2%	17.8%	6.9%	87.2%	
	6 months	8	5	3	5	21	
		1.3%	0.8%	0.5%	0.8%	3.4%	
	6 months to 1 year	3	4	16	19	42	
		0.5%	0.6%	2.6%	3.0%	6.7%	
	1 year to 2 years	1	2	3	6	12	
		0.2%	0.3%	0.5%	1.0%	1.9%	
	>2 years	1	1	1	2	5	
		0.2%	0.2%	0.2%	0.3%	0.8%	

H2O2 as a home bleaching agent, particularly around the upper lateral incisors [9]. Another in vitro investigation examined the color stability after the bleaching and discovered that the bleaching agent affects color stability up to three months after the bleaching [10]. AlOtaibi et al., (2020) conducted a similar study in Saudi Arabia and concluded that most of the participants used home bleaching after getting knowledge from advertisements [11]. Similarly, Moldovan et al., (2022) claimed that over-the-counter bleaching products were used by most of the Romanian population, which is contradictory with our result [12].

Boanfe et al., (2013) showed that home bleaching played a vital role in the degradation of human enamel [12]. They applied home bleaching through gel concentrations of carbamide peroxide (22%) and hydrogen peroxide (35%). Some surfaces had deteriorated that showed the occurrence of enamel erosions. Another in vitro investigation examined the color changes of samples of bleached teeth's enamel and dentin and mixed enamel and dentin; and discovered that the color was not constant over time in terms of luminosity. They demonstrated that mixed enamel and dentin showed promising results for the enamel of the affected teeth [13].

Another clinical study revealed that home bleaching procedures for three months showed more color change stability over a six-month timeframe than in-office bleaching [14]. Another study by Wiegand et al., (2008) [16] demonstrated that the use of the home bleaching method, using 10% carbamide peroxide gel implemented via a tray was comparable to that acquired with the in-office method that implemented 35% H2O2.

Significance and Awareness of Home bleaching

Researchers who have examined the impact of intensive tooth whitening procedures on dentition and vulnerability to demineralization have paid close attention to the danger of teeth structure damage. According to several of these research studies, severe bleaching procedures can alter the microstructure, surface quality, and enamel crystals'

vulnerability to demineralization [17].

How long will the treatment last? This is a question that patients frequently ask. Because a patient may regularly expose their dentition to foods and drinks known to stain the teeth and would suffer re-staining within a month, it is hard to estimate how long bleaching regimens will last. Nevertheless, it would be safe to expect tooth whitening to last up to one year, provided they are not subjected to chromogens like coffee, cigarette smoke, or red wine.

Conclusion

Most of the individuals in our study have asked about their knowledge of home bleaching and its application during dental treatment. Most individuals lack knowledge about appropriate applications of home bleaching. Home bleaching is the most effective remedy for dental treatment as most individuals have got benefits after one week of application. In contrast, some individuals face health complications including the sensitivity of teeth, gingival burn, headache, etc. This study will help explore knowledge of home beaching and its usage in appropriate ways.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

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Conflict of interest

The authors declare no conflict of interest.

References

1. Demarco FF, Meireles SS, Masotti AS. Over-the-counter whitening agents: a concise review. Braz Oral Res. 2009; 23(Suppl.1):S64-70.

2. Pinto MM, De Godoy CHL, Bortoletto CC, Olivan SRG, Motta LJ, Altavista, et al. Tooth whitening with hydrogen peroxide in adolescents: study protocol for a randomized controlled trial. Trials. 2014;15(1):1-5.

3. Joiner A. The bleaching of teeth: a review of the literature. J Dent. 2006;34(7):412-9.

4. Carey CM. Tooth whitening: what we now know. J Evid Based Dent Pract. 2014; 14(Suppl.):S70-6.

5. Joshi SB. An overview of vital teeth bleaching. J Interdiscip Dent. 2016; 6(1):3-13.

6. Kwon SR, Wertz PW. Review of the mechanism of tooth whitening. J Esthet Restor Dent. 2015; 27(5)240-57.

7. Kim JH, Kim Y, Shin SJ, Park JW, Jung IY. Tooth discoloration of immature permanent incisor associated with triple antibiotic therapy: a case report. J Endod. 2010; 36(6)1086-1.

8. Lima FG, Rotta TA, Penso S, Meireles SS, Demarco FF. In vitro evaluation of the whitening effect of mouth rinses containing hydrogen peroxide. Braz Oral Res. 2012; 26:269-4.

9. Barabolak R, Hoerman K, Kroll B. Record D. Gum chewing profiles in the US population. Community Dent Oral Epidemiol. 1991;19(2):125-6.

10. Walters PA, Biesbrock AR, Bartizek RD. Benefits of sodium hexametaphosphate-containing chewing gum for extrinsic stain inhibition. J Dent Hyg. 2004;78(4):8.

11. AlOtaibi G, AlMutairi MS, AlShammari MZ, AlJafar M, AlMaraikhi TF. Prevalence and public knowledge regarding tooth bleaching in Saudi Arabia. J Family Med Prim Care. 2020; 9(7):3729-32.

12. Moldovan AM, Popescu V, Ionescu CV, Cuc S, Craciun A, Moldovan M, et al. Various Aspects Involved in the Study of Tooth Bleaching Procedure: A Questionnaire–Based Study. Int J Environ Res Public Health. 2022; 19(7): 3977.

13. Bonafé E, Bacovis CL, Iensen S, Loguercio AD, Reis A, Kossatz S. Tooth sensitivity and efficacy of in-office bleaching in restored teeth. J Dent. 2013; 41(4)363-9.

14. Hahn P, Schondelmaier N, Wolkewitz M, Altenburger MJ, Polydorou O. Efficacy of tooth bleaching with and without light activation and its effect on the pulp temperature: an in vitro study. Odontology. 2013;101(1):67-4.

15. Tompkins AM, Coleman SS, Carey CM. Erosive capacity of five commercial bleaching products on human enamel. J Dent Res. 2014; 93:697.

16. Wiegand A, Drebenstedt S, Roos M, Magalhães AC, Attin T. 12-Month color stability of enamel, dentine, and enamel–dentine samples after bleaching. Clin Oral Investig. 2008; 12(4)303-10.

17. Bernardon JK, Sartori N, Ballarin A, Perdigão J, Lopes G, Baratieri LN. Clinical performance of vital bleaching techniques. Oper Dent. 2010; 35(1):3-10.

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